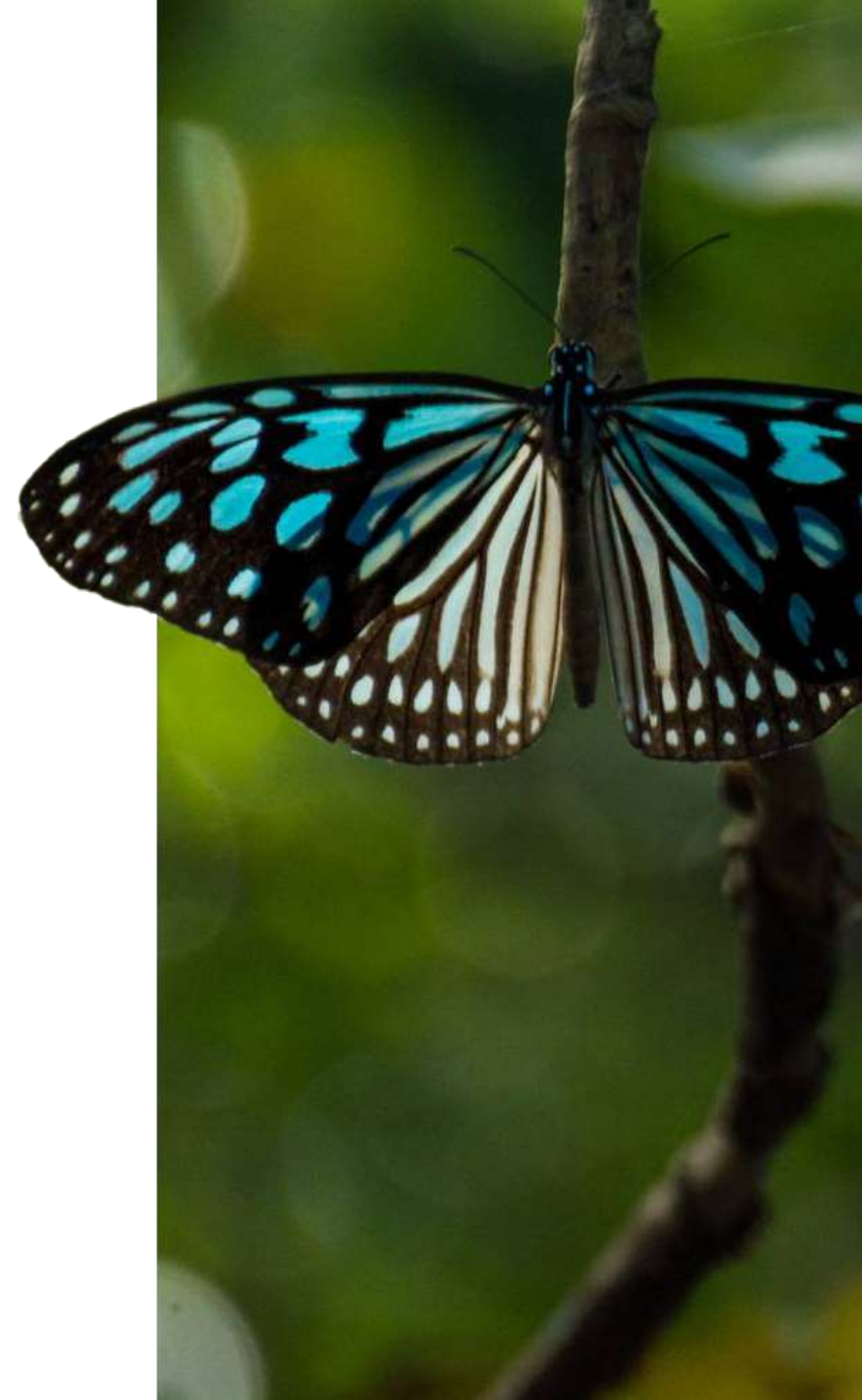Proposed By: Hamza Magdy

RAIN IN AUSTRALIA

Predicting Rain and Rainfall

Introduction

The issue of Climate Change is threating the existence of all humanity, it includes rising sea levels, ecosystem collapse and more frequent and severe weather. Rising temperatures from human-caused greenhouse gas emissions affects planet-wide systems causing drought and severe heat.

Problem Definition

Due to the recent climate change which caused severe droughts and higher temperatures it is now harder for farmers to know what kind of weather to expect to determine which crops to grow to maximize revenue and efficiency.

Predicting Rain and Rainfall

Desired Outcome

The ability to predict whether it will rain and the quantity of the rain, to help farmers make decisions on the best crop to grow, to maximize profit, efficiency and reduce food shortages.

Features

Date	Location	MinTemp	MaxTemp	Rainfall
The date of observation.	The common name of the location of the weather station.	The minimum temperature in degrees Celsius.	The maximum temperature in degrees Celsius.	The amount of rainfall recorded for the day in mm.

Features Cont.

Evaporation

The so-called Class A pan evaporation (mm) in the 24 hours to 9am.

Sunshine

The number of hours of bright sunshine in the day.

WindGustDir

The direction of the strongest wind gust in the 24 hours to midnight.

WindGustSpeed

The speed (km/h) of the strongest wind gust in the 24 hours to midnight.

WindDir9am

Direction of the wind at 9am.

Features Cont.

WindDir3pm	WindSpeed9am	WindSpeed3pm	Humidity9am	Humidity3pm
Direction of the wind at 3pm.	Wind speed (km/hr) averaged over 10 minutes prior to 9am.	Wind speed (km/hr) averaged over 10 minutes prior to 3pm.	Humidity (percent) at 9am.	Humidity (percent) at 3pm.

Features Cont.

Pressure9am

Atmospheric pressure (hpa) reduced to mean sea level at 9am.

Pressure3pm

Atmospheric pressure (hpa) reduced to mean sea level at 3pm.

Cloud9am

Fraction of sky obscured by cloud at 9am. This is measured in "oktas", which are a unit of eigths.

Cloud3pm

Fraction of sky obscured by cloud (in "oktas": eighths) at 3pm.

Temp9am

Temperature (degrees C) at 9am.
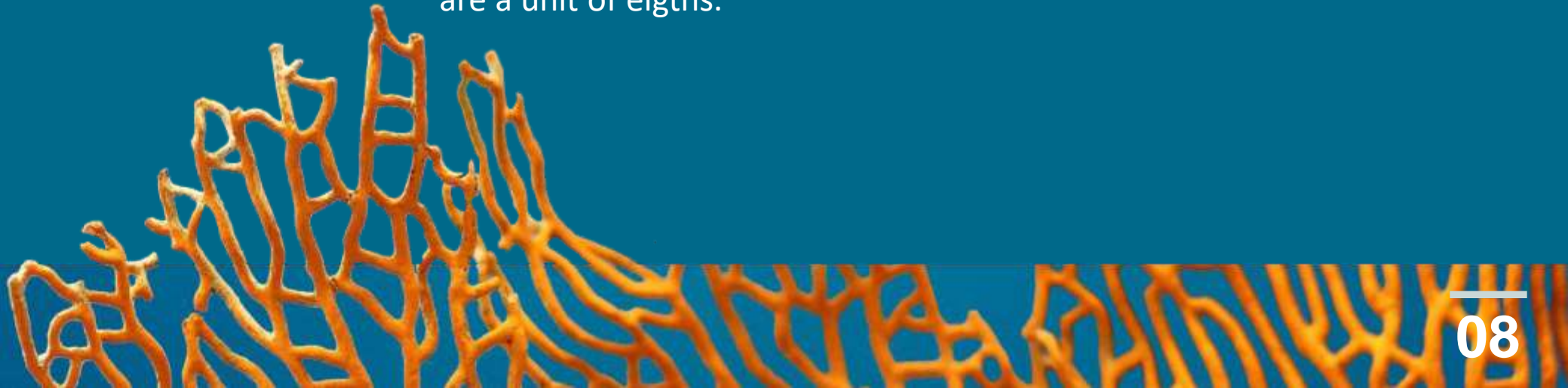
Features Cont.

Temp3pm

Temperature (degrees C) at 3pm.

RainToday

Boolean: 1 if precipitation (mm) in the 24 hours to 9am exceeds 1mm, otherwise 0.

RainTomorrow

The amount of next day rain in mm. Used to create response variable RainTomorrow. A kind of measure of the "risk".

Questions:

- Does having rain today have an effect on rain?

- Does Minimum Temp have an effect on rain?

- Does Maximum Temp have an effect on rain?

- Does Sunshine have an effect on rain?

- Does WindGustSpeed have an effect rain?

- Does Humidity have an effect on rain?

- Does Pressure have an effect on rain?

- Does Minimum Temp have an effect on rainfall?

- Does Maximum Temp have an effect on rainfall?

- Does Sunshine have an effect on rainfall?

- Does WindGustSpeed have an effect on rainfall?

- Does Humidity have an effect on rainfall?

- Does Pressure have an effect on rainfall?

Questions:

Does having rain today have an effect on rain?
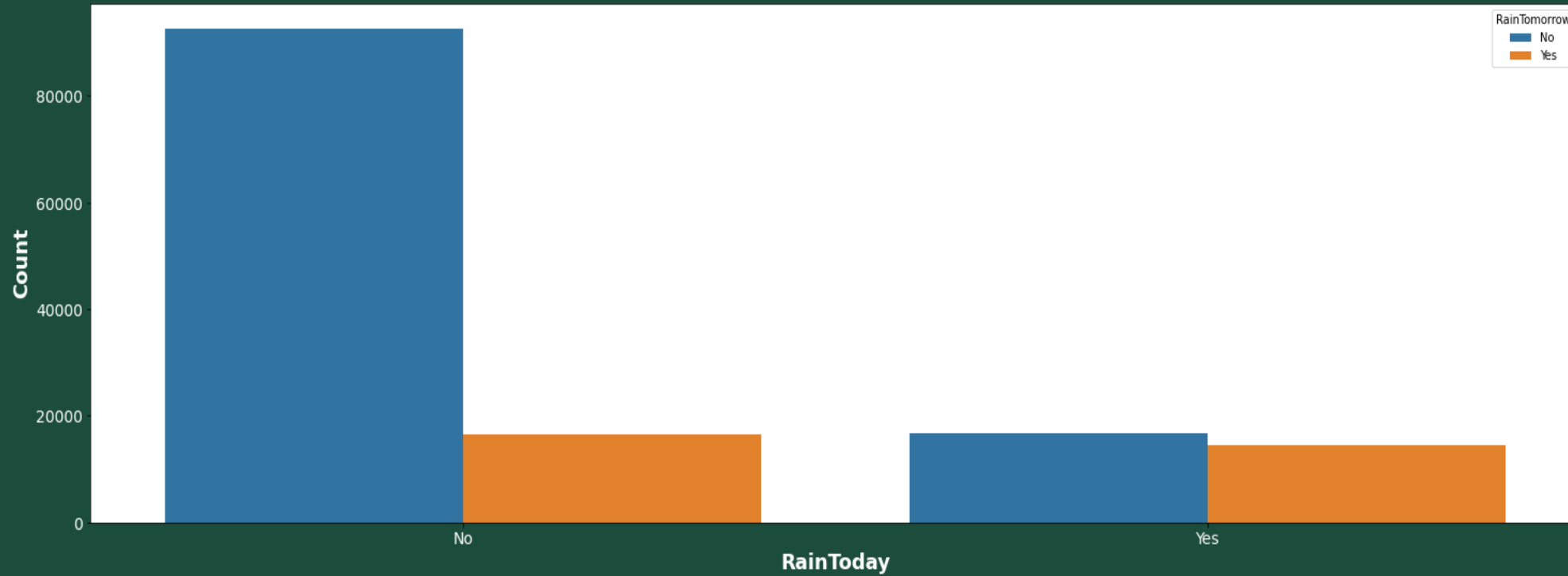
Questions:

Does Minimum Temperature have an effect on rain?
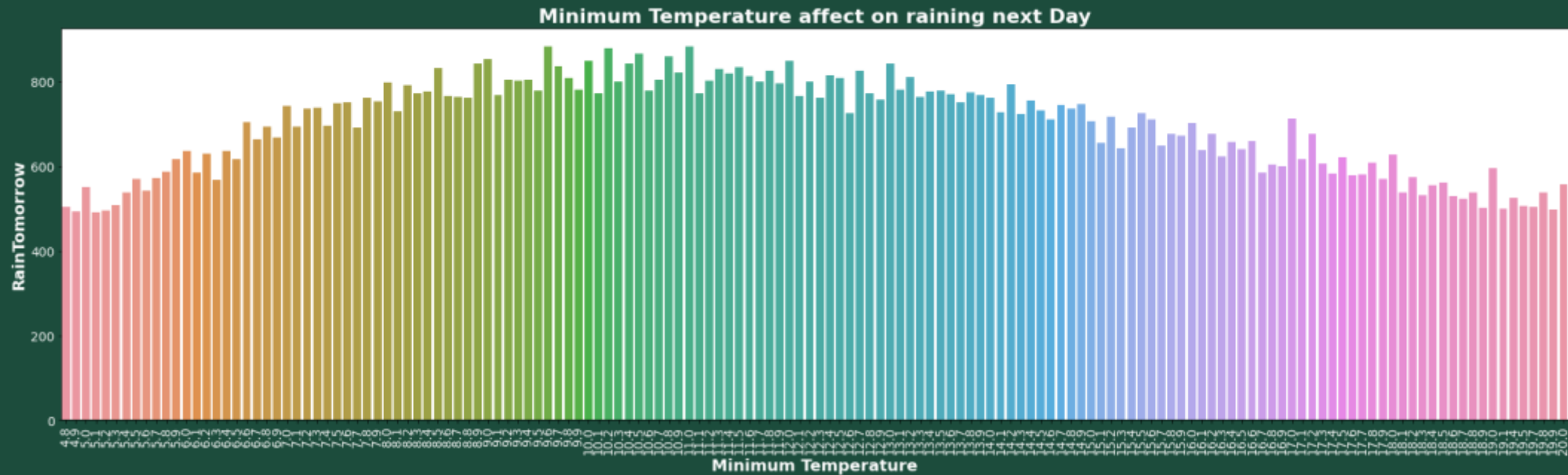
Minimum Temperature affect on raining next Day

Questions:

Does Minimum Temperature have an effect on rain?
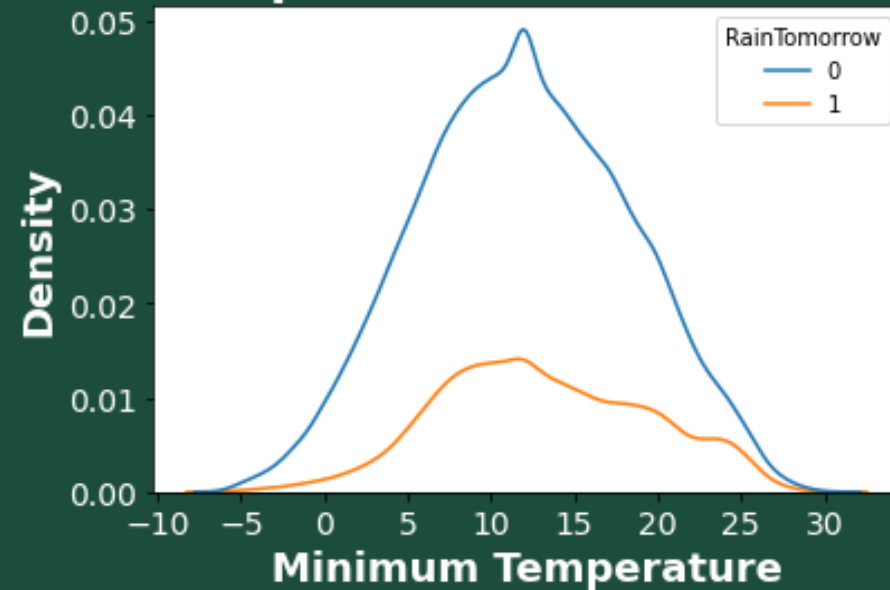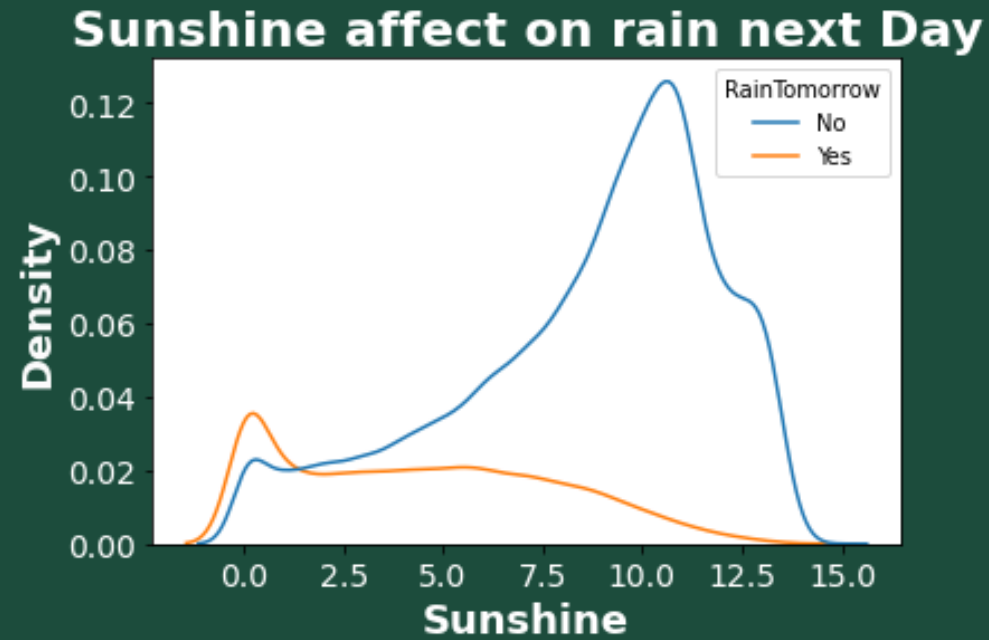

Minimum Temperature affect on rain next Day
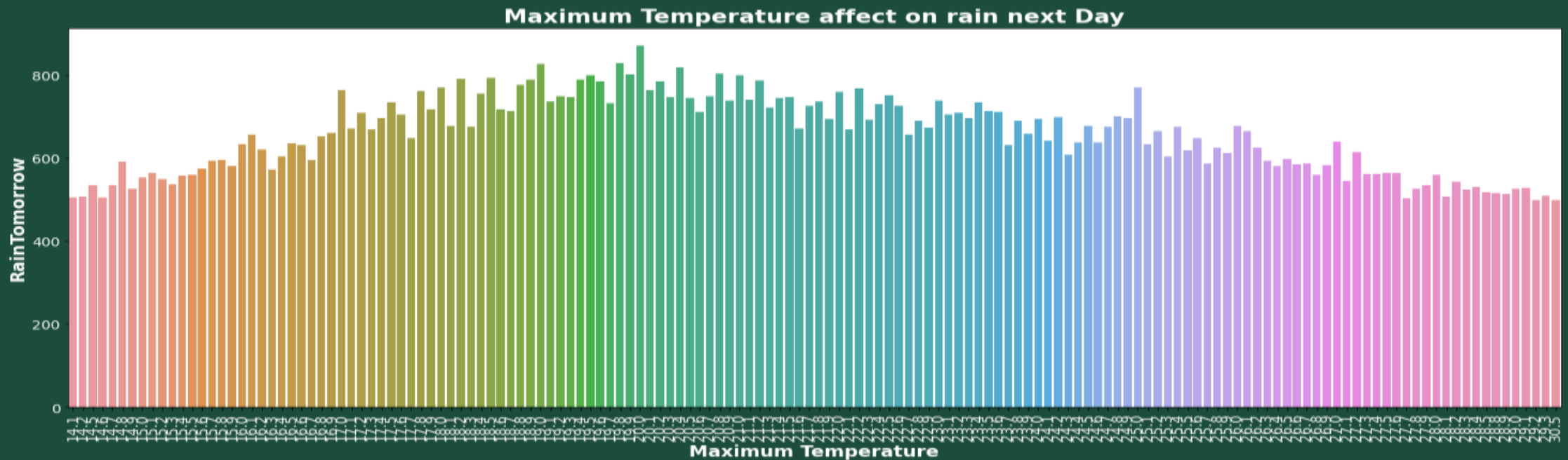
Questions:

Does Maximum Temperature have an effect on rain?

Maximum Temperature affect on rain next Day
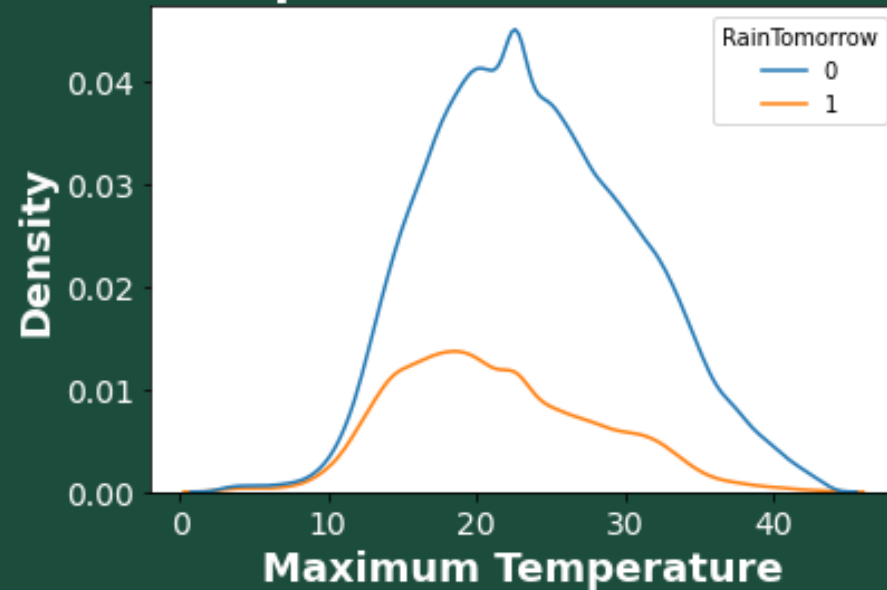
Questions:

Does Minimum Temperature have an effect on rain?

Questions:

Does sunshine have an effect on rain?

Questions:

Does sunshine have an effect on rain?

Questions:

Does wind gust speed have an effect on rain?

Questions:

Does wind gust speed have an effect on rain?

Questions:

Does average humidity have an effect on rain?
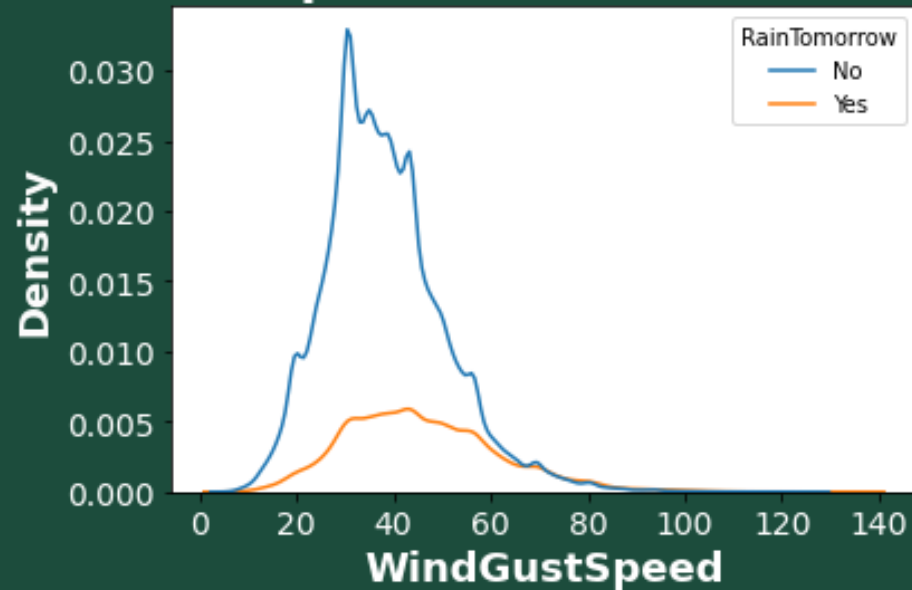
Average Humidity affect on rain next Day

Questions:
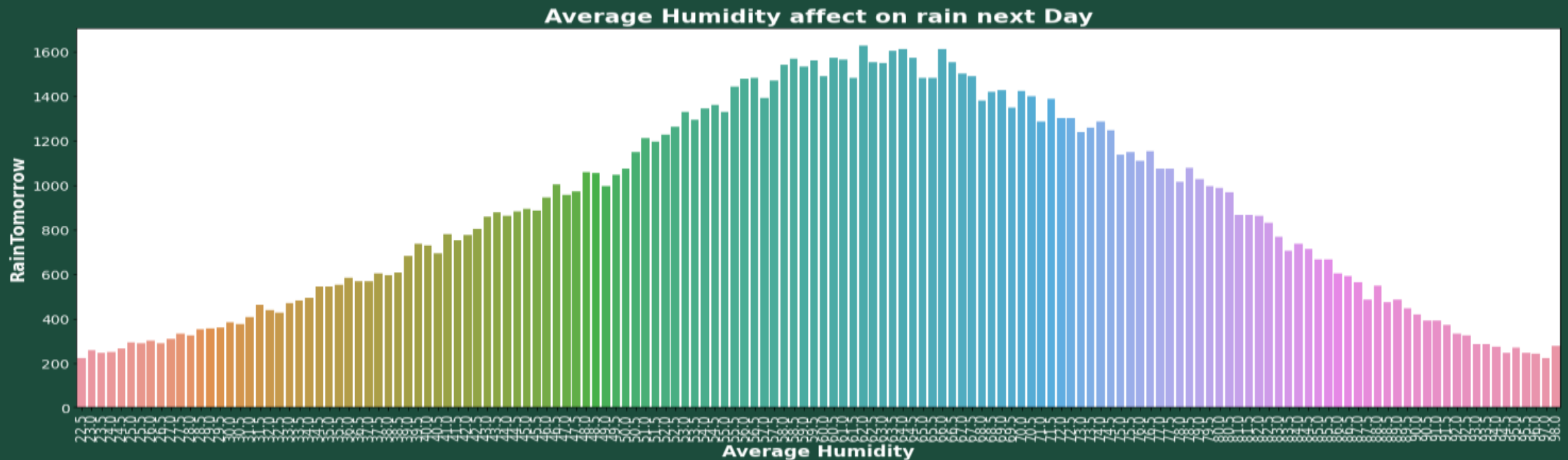
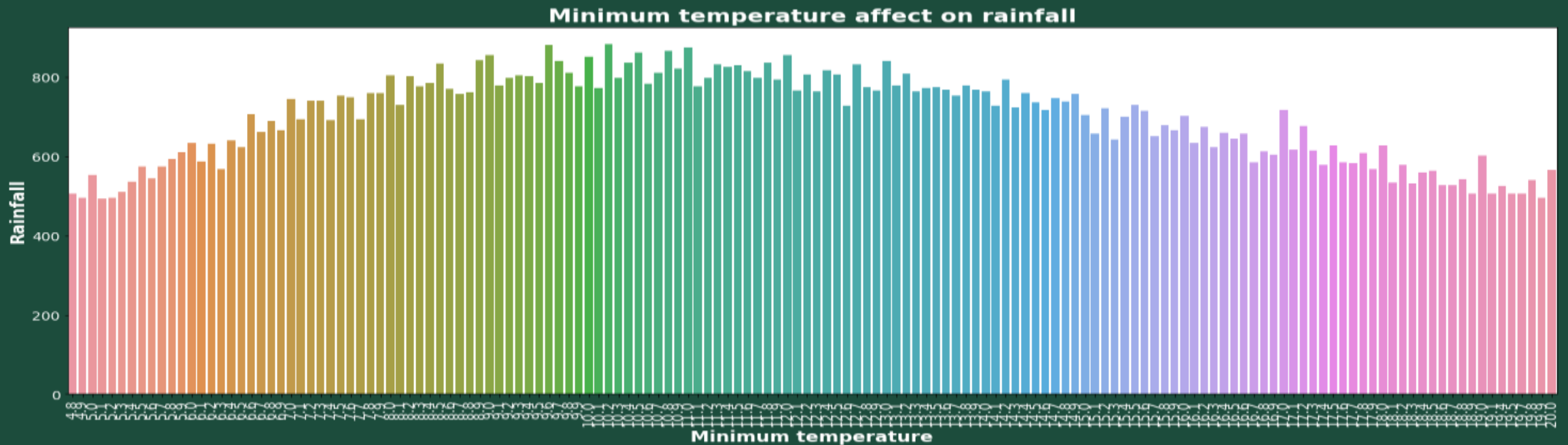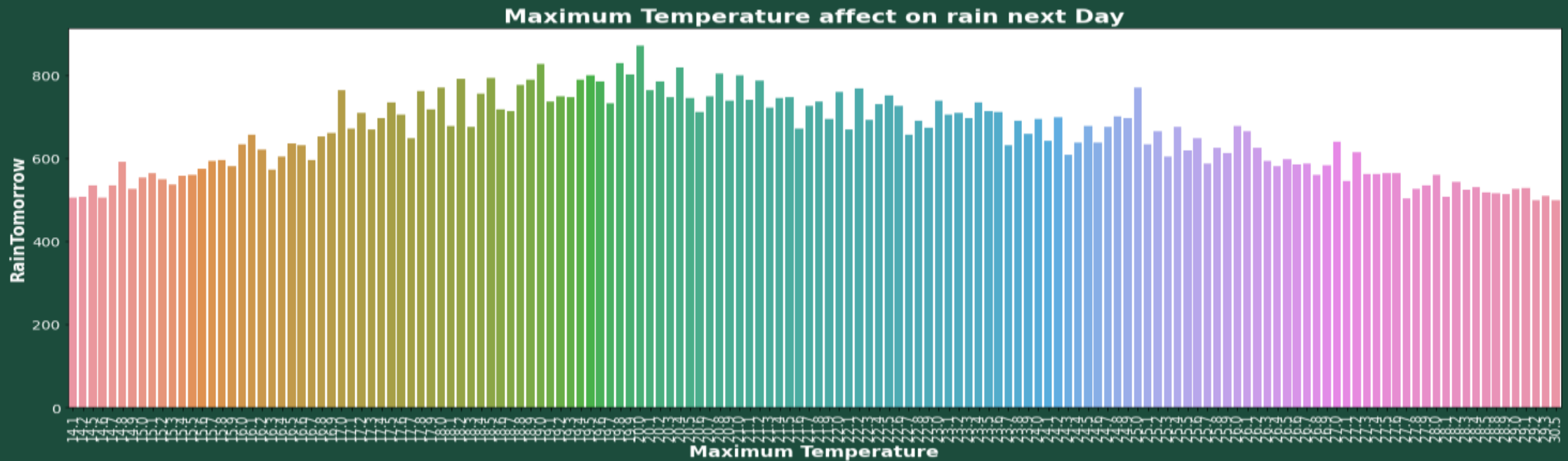Does average humidity have an effect on rain?

Average Humidity affect on rain next Day

Questions:

Does average pressure have an effect on rain?

Average Pressure affect on rain next Day

Questions:

Does average pressure have an effect on rain?

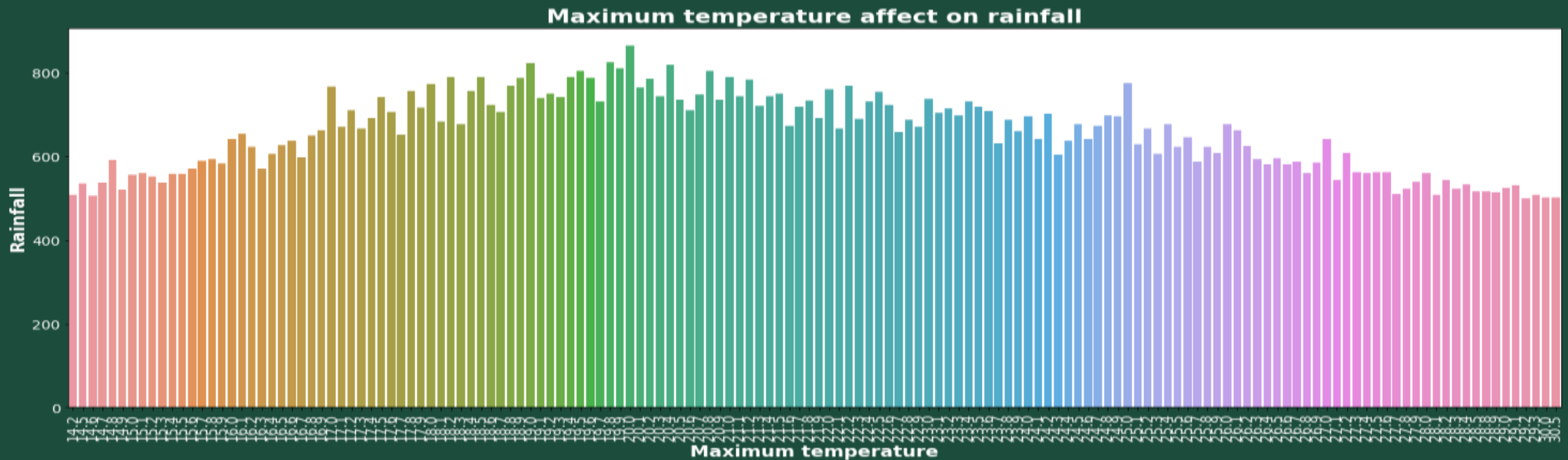Average Pressure affect on rain next Day
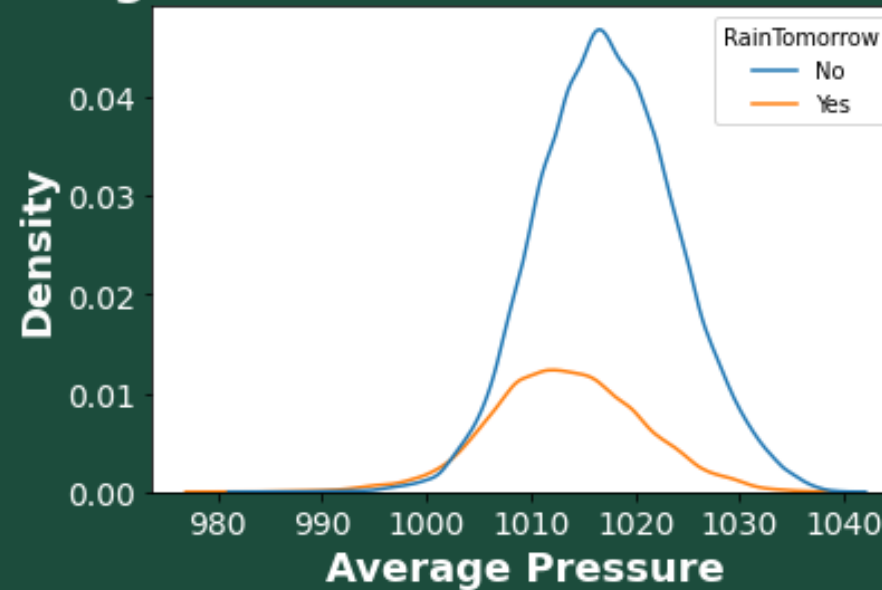
Rain pair plot

Questions:

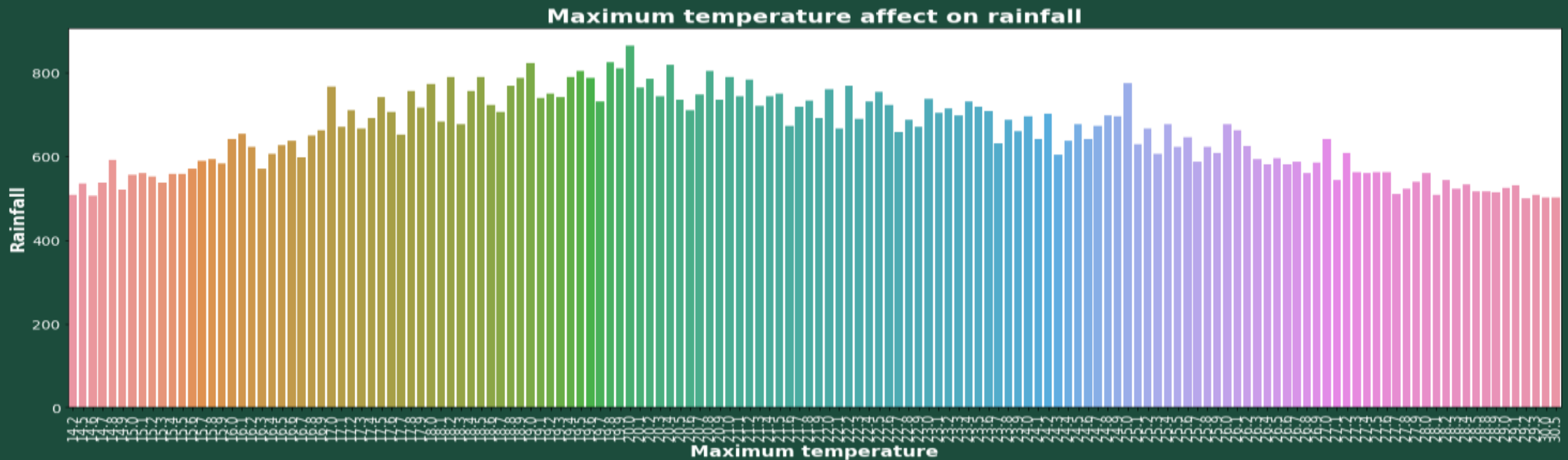Does minimum temperature have an effect on rainfall?

Questions:

Does maximum temperature have an effect on rainfall?

Questions:

Does maximum temperature have an effect on rainfall?
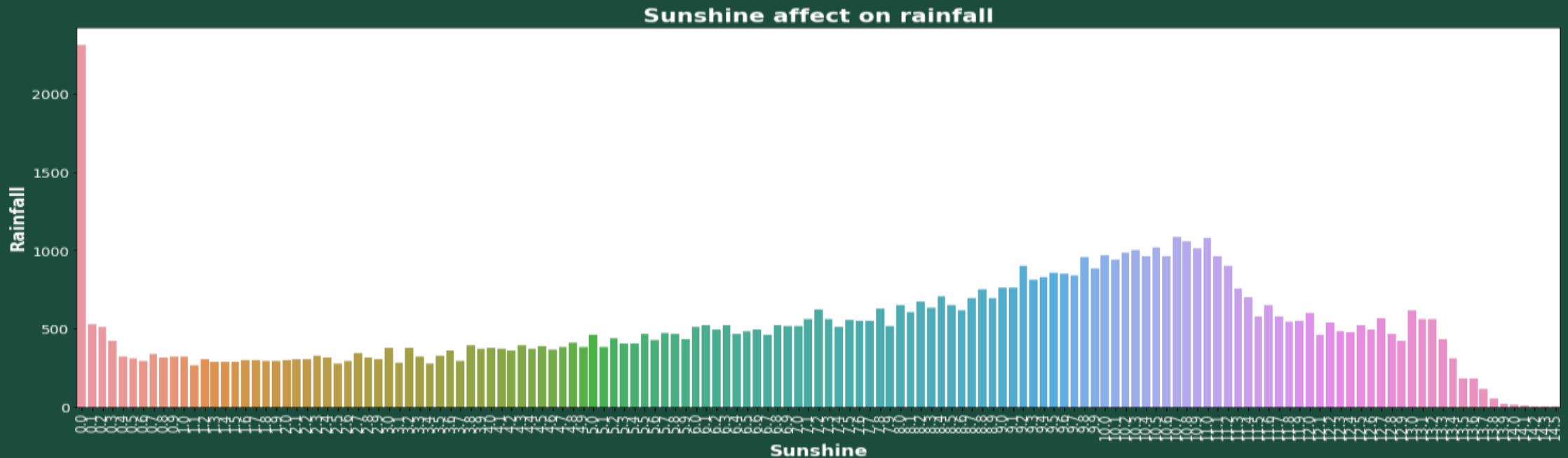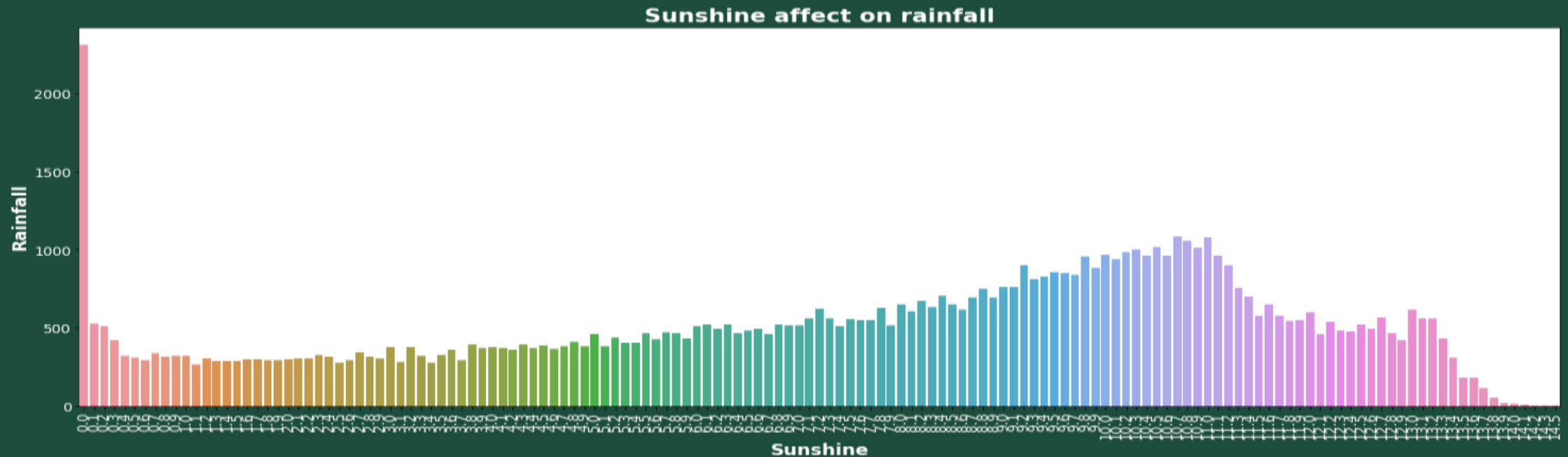
Questions:

Does maximum temperature have an effect on rainfall?

Questions:

Does sunshine have an effect on rainfall?

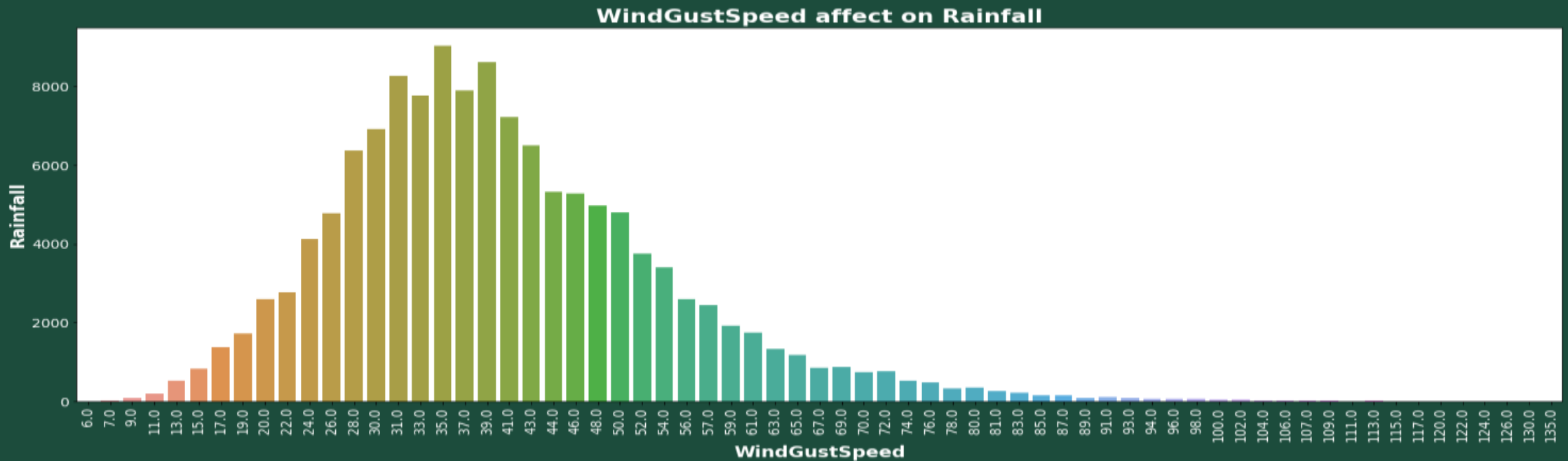

Sunshine affect on rainfall
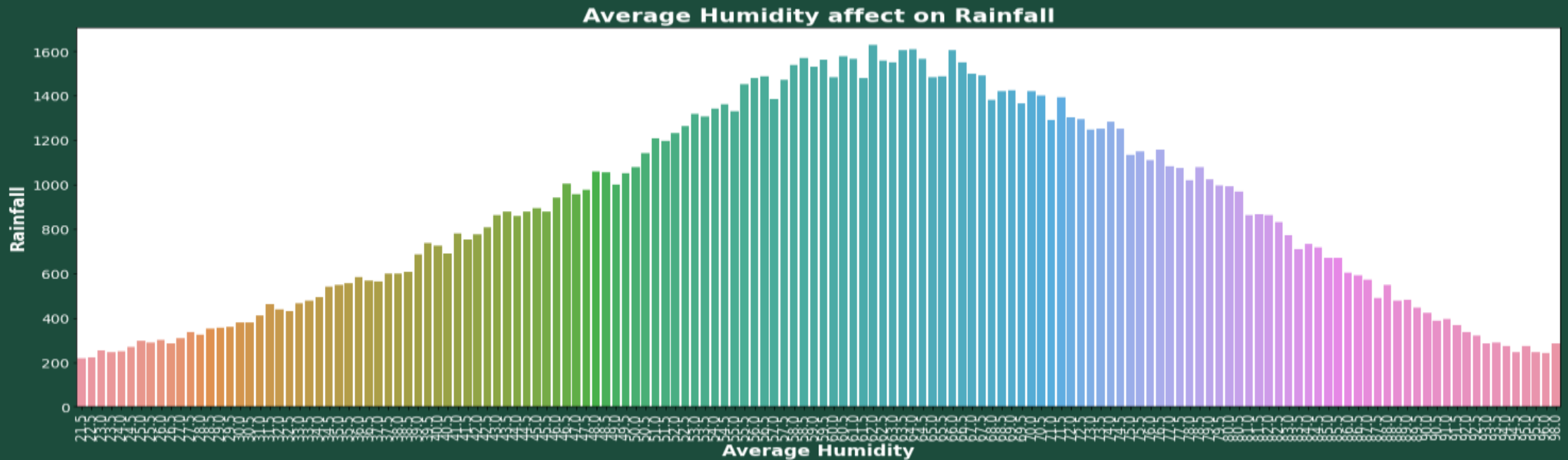
Questions:

Does sunshine have an effect on rainfall?

Questions:

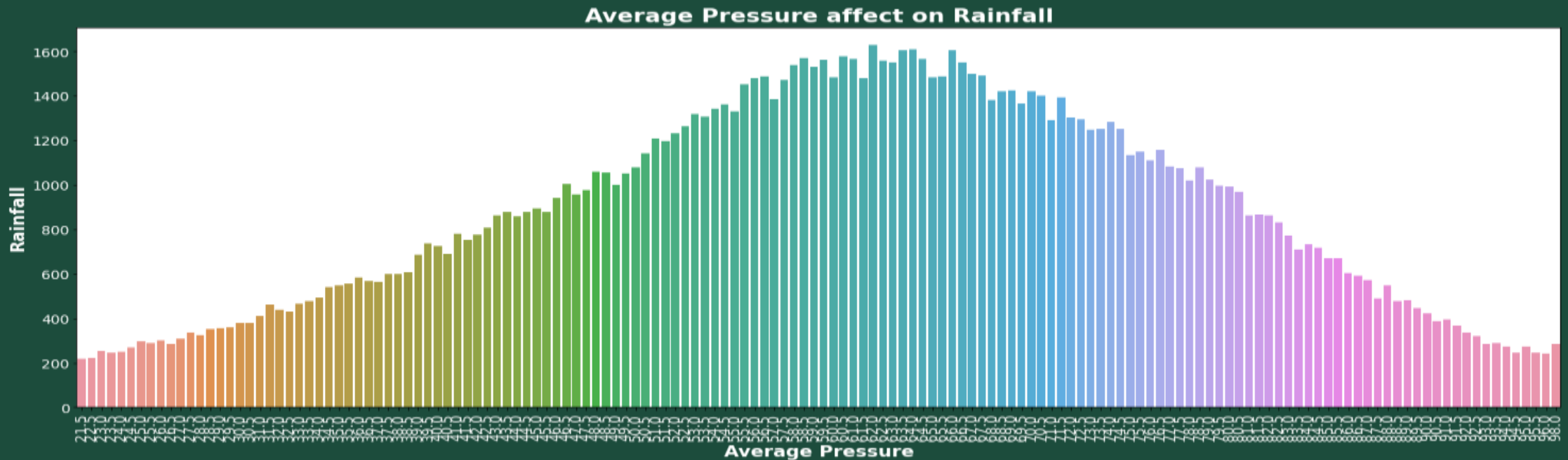Does wind gust speed have an effect on rainfall?

Questions:

Does average humidity have an effect on rainfall?

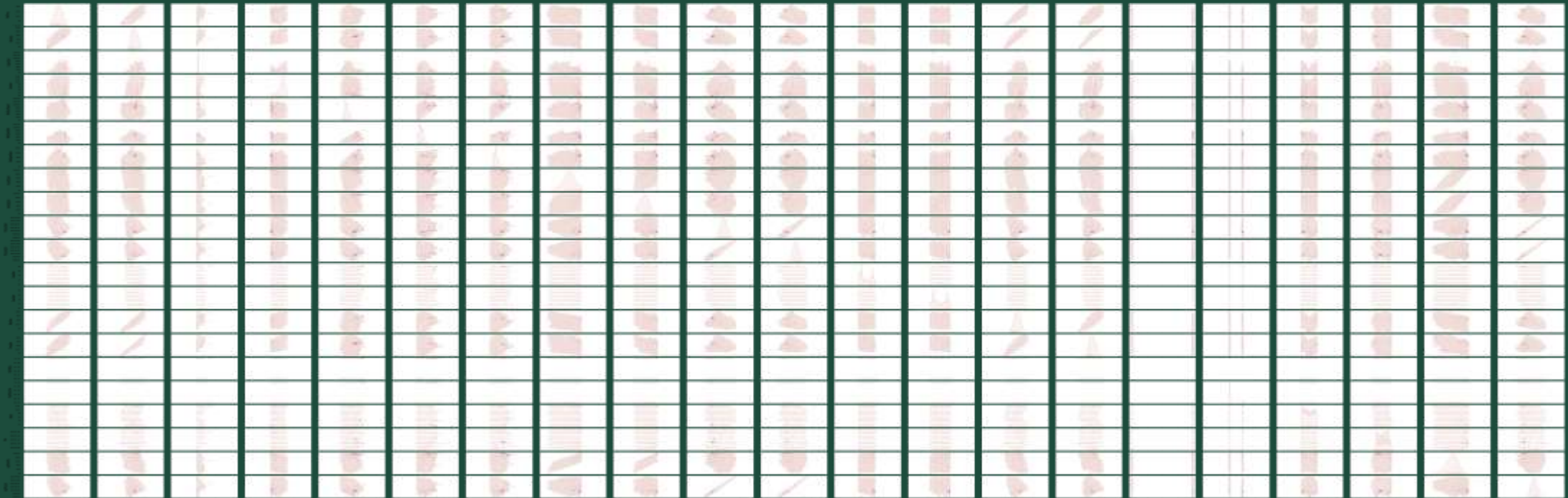Average Humidity affect on Rainfall

Questions:

Does average pressure have an effect on rainfall?

Questions:

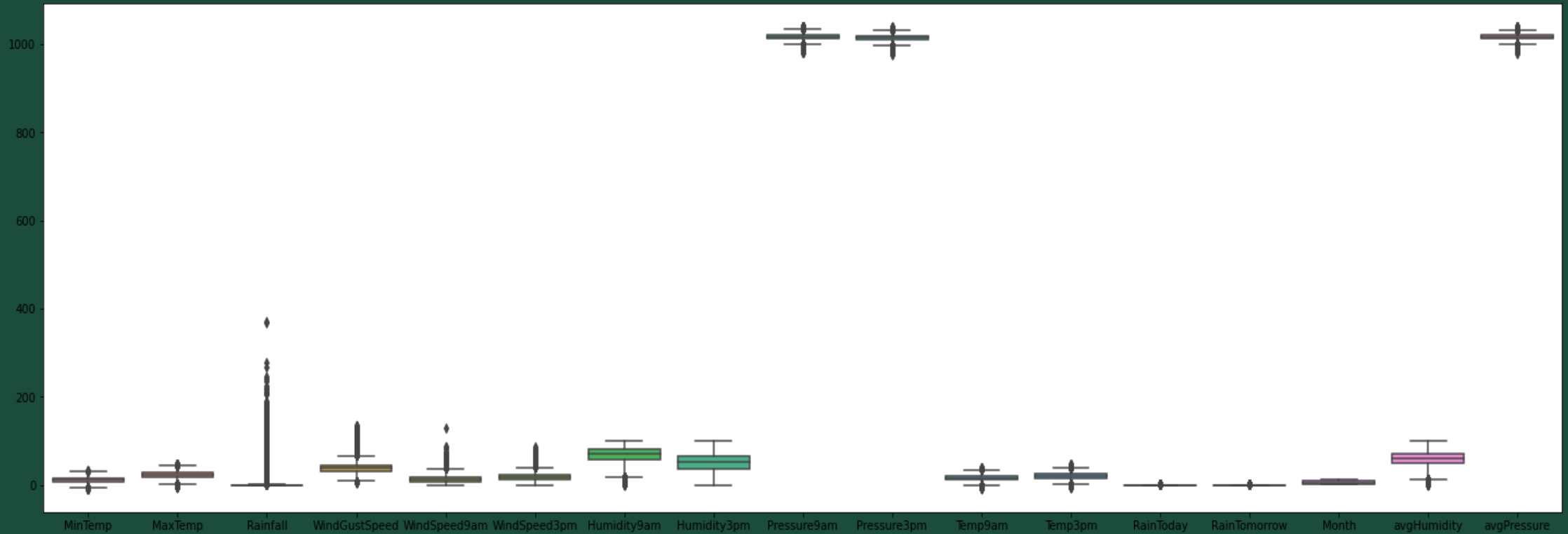Rainfall pair plot

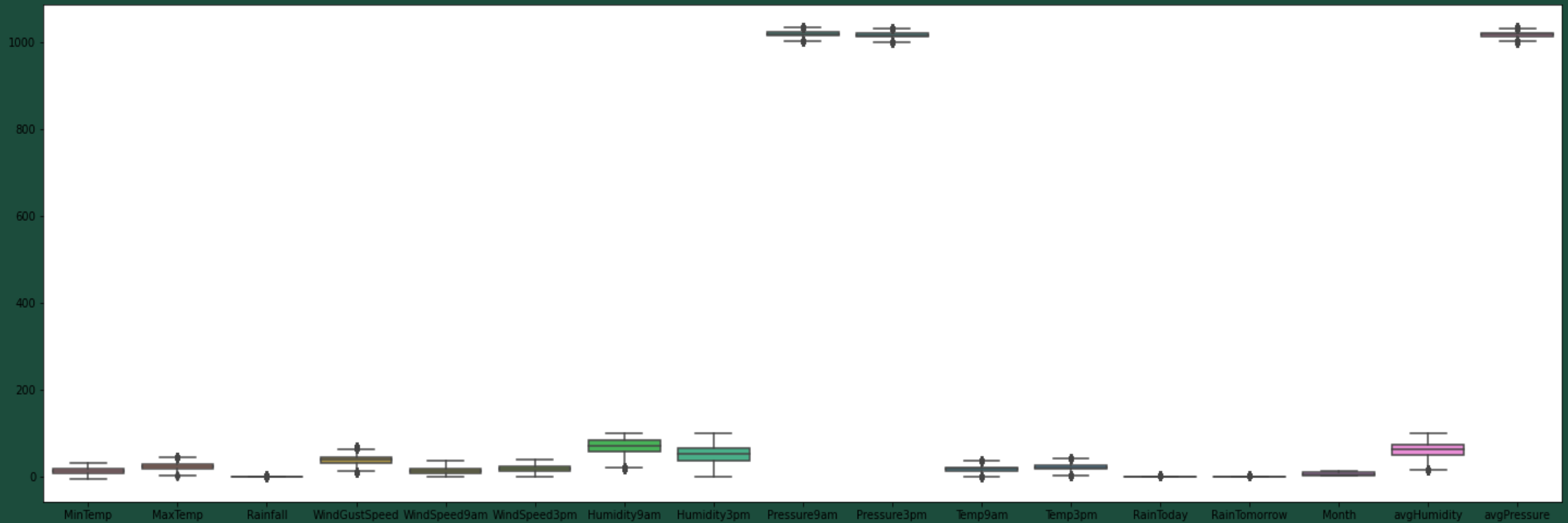# Correlation:

Preprocessing steps:

- Feature Extraction

- Handle Missing Values

- Handling Categorical Data

- Handling Outliers

- Split Data into Train and Test

- Handle Imbalance

- Feature Scaling

Outliers:

Outliers:

Thank You